

Model Optimization and Tuning Phase

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Team ID	SWTID1726888137
Project Title	intelligent handwritten digit identification system for computer applications
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters
Model 1	<ul style="list-style-type: none"> - Learning Rate: 0.001 - Batch Size: 200 - Epochs: 10 - Dropout Rate (fully connected layers): 0.5 - Number of Filters in Conv Layer 1: 32 - Number of Filters in Conv Layer 2: 64 - Pooling Type: MaxPooling2D - Use of Batch Normalization: Yes - Early Stopping: Implemented with patience of 3 epochs

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Model 1 (or other)	<ul style="list-style-type: none"> - Performance: Model 1 demonstrated superior accuracy and lower loss on the validation dataset compared to other models, with an accuracy exceeding 98%. - Complexity: The model effectively balances complexity and performance, utilizing convolutional layers to extract features while preventing overfitting with dropout and batch normalization. - Training Time: The training time was reasonable given the architecture, and with proper tuning, it converged well within the specified epochs. - Robustness: The model showed robust performance during validation, maintaining consistent accuracy across various datasets, including augmented images. - Scalability: The architecture allows for easy scaling and fine-tuning for more complex datasets or additional features in the future. - User Feedback: Positive feedback from initial testing in the GUI application indicated that the model performs well in real-world scenarios.